Concept for Radioactivity Dispersal System Capable of Bypassing Standard Detection Methods and Introducing Radioactivity on Delayed Basis

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Introduction

Unconventional radioactivity-spreading improved devices continue to pose a hypothetical threat to civilian populations around the world. Such a device would be of keen interest to any number of terrorist or extremist groups. Unfortunately, those agencies which are tasked with preparing for such attacks are unaware of many possible weapons designs which may be used to bypass detection and to exact maximal devastation. In this abstract, I will discuss one such potential design which is well-within the reach of any entity with access to fairly antiquated microchip assembly equipment.

Abstract

Standard detection methods looking for gamma rays and neutron flux to detect materials such as uranium which are likely to be found in a “dirty bomb.” Materials such as lead can be used to block the neutron flux associated with these materials, but the thickness of lead required is proportional to the mass of uranium in each granule (provided that granules are being utilized) and proportional to the purity of the uranium.

It is likely that terrorists would choose to utilize tiny granules much smaller than ball bearings which could be parsed and encapsulated using the same sort of equipment used to conduct bulk soldering of microchips. With tiny granules of uranium, a comparatively thin layer of lead would be sufficient to block any neutrons generated.

I would suggest that a terrorist organization might add a third layer to the encapsulated uranium composed of elemental sodium. By encapsulating the overall granules with elemental sodium, water could be used as the time-delayed triggering mechanism. Granules also provide the advantage of being dispersible using the same systems used for crop dusting.

A terrorist organization might use these crop dusters to disperse radioactive granules in a circle around major cities, but not directly within the major cities. By so doing, radiation detectors located in major cities would not detect the radioactivity until an advanced stage of spread and the ensuing panic would cause city-dwellers to, even against advice from the government, attempt to travel through the affected circumference. That is merely one attack scenario. Equally devastating would be for the granules to be dispersed over farmland, however, that approach would require that too large of an area be covered. Urban targets would likely remain most appealing to an entity with a limited quantity of tri-encapsulated uranium on hand.

Conclusion

Such an implementation of an attack is increasingly likely given the widespread availability of non-enriched or only slightly enriched uranium as well as the availability of the micro-soldering equipment needed to perform the granulation and encapsulation of the materials, particularly given the current geopolitical climate.